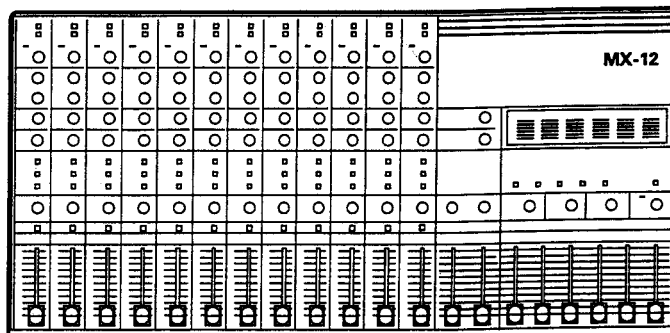




# SERVICE MANUAL

## MX-12

### RECORDING MIXER



#### CAUTION

1. Parts identified by the  $\triangle$  symbol on the schematic diagram and the parts list are critical for safety.  
Use only replacement parts that have critical characteristics recommended by the manufacturer.
2. Make leakage-current or resistance measurements to determine that exposed parts are acceptably insulated from the supply circuit before returning the appliance to the customer.

## Specifications

#### Mixer section

##### Mic/Line input (x12)

Input level (Mic).....-50 dBV at trim max  
(Line).....-10 dBV at trim min  
Impedance..... 50 kohms

##### Effect return (Stereo)

Level.....-10 dBV/5 kohms

##### Effect output

Level.....-10 dBV/100 ohms

##### Equalizer

Low..... 100 Hz  $\pm$  12 dB  
High..... 10 kHz  $\pm$  12 dB

#### Others

##### Power requirements

For U.S.A. & Canada.....AC 120 V, 60 Hz  
For Europe.....AC 220 V/240 V, 50 Hz

##### Power consumption

25 watts

##### Dimensions

625 mm (24-5/8") W  
110 mm (4-3/8") H  
343 mm (13-9/16") D

##### Weight

6.8 kg (15 lbs) net

\* Design and specifications subject to changes without notice for improvements.

\* Due to local laws and regulations, this unit sold in some areas are not equipped with variable voltage selectors.

## NOTICE

- Some printed circuit board are not supplied assembled.  
To separate these in this Service Manual the stock numbers are not indicated for these boards. However, stock numbers for individual parts are indicated.
- Since some capacitors and resistors are omitted from parts lists in this Parts List, refer to the Common Parts List for capacitors and resistors, which was issued on June 1987.
- The symbols, OO, UL, CSA, EU, EG and XX on the Parts list and the schematic diagram mean followings respectively.  
OO ..... Manufactured for Japan market.  
UL ..... Manufactured for U.S.A market.  
(Underwriters Laboratories approved model.)  
CSA ..... Manufactured for Canadian market.  
EU ..... Manufactured for European market.  
(Except F.R. Germany)  
EG ..... Manufactured for F.R. Germany market.  
XX ..... Standard Version.  
NON MARK ..... Common Parts.

4. Abbreviations in this Parts List are as follows.

•Abbreviations List			
C.R.	: Carbon Resistor	E.B.L	: Low Leak Bi-Polar Electrolytic Capacitor
S.R.	: Solid Resistor	Ta.C.	: Tantalum Capacitor
Ce.R.	: Cement Resistor	F.C.	: Film Capacitor
M.R.	: Metal Film Resistor	M.P.	: Metalized Paper Capacitor
F.R.	: Fusing Resistor	P.C.	: Polystyrene Capacitor
N.I.R.	: Non-Inflammable Resistor	M.M.C.	: Metalized Mylar Capacitor
A.R.	: Array Resistor	A.C.	: Array Capacitor
C.C.	: Ceramic Capacitor	V.R.	: Variable Resistor
C.T.	: Ceramic Capacitor, Temperature Compensation	S.V.R.	: Semi Variable Resistor
E.C.	: Electrolytic Capacitor	SW.	: Switch
E.L.	: Low Leak Electrolytic Capacitor	Chip R.	: Chip Resistor
E.B.	: Bi-Polar Electrolytic Capacitor	Chip C.	: Chip Capacitor

## 1. MAIN PARTS REPLACEMENT

## 1. 主要部品の交換法

## A. Case Cover Ass'y removal (See Fig. 1-1 and Bottom View on page 8)

- Remove the rear panel fastening screws S1 and S2.
- Remove the bottom cover fastening screws S3 through S16.

## B. Mic &amp; Control AMP Board (F-6078a) removal (See Top View on page 8)

- Remove the 6 slide volume knobs ㊸.
- Remove the 3 knob ass'ys ㊹.
- Remove the 9 PC board fastening screws.

## C. Mic &amp; Control AMP Board (F-6078b) removal (See Top View on page 8)

- Remove the 6 slide volume knobs ㊸.
- Remove the 3 knob ass'ys ㊹.
- Remove the 9 PC board fastening screws.

## D. Control &amp; Power AMP Board (F-6138) removal

- Remove the 2 ㊸ and 6 ㊹ slide volume knobs respectively.
- Remove the 8 PC board fastening screws.

## A. Case Cover Assyの外し方

(Fig.1-1及び8ページのBottom View参照)

- リアパネル止めビスS<sub>1</sub>, S<sub>2</sub>を外す.
- 底板部の止めビスS<sub>3</sub>~S<sub>16</sub>を外す.

## B. MIC&amp;コントロールアンプ基板, F-6078aの外し方.

(8ページのTop View参照)

- スライドボリュームノブ㊸6ヶを外す.
- Knob Ass'y ㊹3ヶを外す.
- 基板取付ビス9本を外す.

## C. MIC&amp;コントロールアンプ基板, F-6078bの外し方.

(8ページのTop View参照)

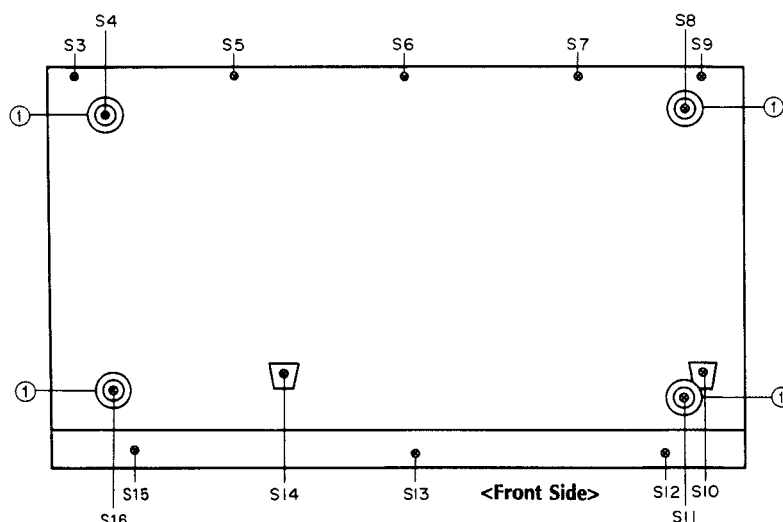
- スライドボリュームノブ㊸6ヶを外す.
- Knob Ass'y ㊹3ヶを外す.
- 基板取付ビス9本を外す.

## D. コントロール&amp;パワーアンプ基板, F-6138の外し方.

- スライドボリュームノブ㊸2ヶ, ㊹6ヶを外す.
- 基板取付ビス8本を外す.

## &lt;Bottom View&gt;

Fig. 1-1



### 3. PARTS LOCATION OF BOARD

#### 3-1. F-6078 MIC & Control AMP Board

<Stock No. 16565500=F-6078a>

<Stock No. 16565400=F-6078b>

Parts No.	Stock No.	Description
•Transistor		
gQ101, 201, 301, 401, 501, 601	48171600	DTC114YS
•IC		
gIC101, 202, 303	46288800	M5220L
or	49395000	NJM2068L-D
•Diode		
gD101, 201, 301, 401, 501, 601	46464100	1SS133
gLD101, 201, 301, 401, 501, 601	46470200	SEL2210S
gC101, 201, 301, 401, 501, 601	48663800	1000pF 50V C.C.
gC103, 203, 303, 403, 503, 603	48659000	15pF 50V C.C.
gVR101, 201, 301, 401, 501, 601	49369700	10kΩ (C) V.R., TRIM Level
•IC		
jIC101, 202, 303, 404, 505, 606	46078900	M5218L
jIC102, 202, 302	46078900	M5218L
jR121, 221, 321, 421, 521, 621	49375300	10kΩx6 A.R.
jC112, 212, 312, 412, 512, 612	48662600	100pF 50V C.C.
jC116, 216, 316, 416, 516, 616	48659000	15pF 50V C.C.
jVR101, 201, 301, 401, 501, 601	49442200	10kΩ (A) V.R., INPUT LEVEL
jVR102, 202, 302, 402, 502, 602	49369800	50kΩ (B) V.R., HIGH
jVR103, 203, 303, 403, 503, 603	49369800	50kΩ (B) V.R., LOW
jVR104, 204, 304, 404, 504, 604	49369900	10kΩ (B) V.R., PAN

<F-6078>

Parts No.	Stock No.	Description
jVR105, 205, 305, 405, 505, 605	49370000	10kΩ (A) V.R., AUX-1
jVR106, 206, 306, 406, 506, 606	49370000	10kΩ (A) V.R., AUX-2
oS101, 201, 301, 401, 501, 601	49369000	Push SW., MIC/LINE, TAPE
oS102, 202, 302, 402, 502, 602	49367800	Push SW., SOLO
oS103, 203, 303, 403, 503, 603	49368400	Push SW., ASSIGN

#### 3-2. F-6131 MIC Jack Board

Parts No.	Stock No.	Description
gC901~912	48663400	470PF 50V C.C. <E.G.>
oJ1	49360800	Jack, MIC1
oJ2	49360800	Jack, MIC2
oJ3	49360800	Jack, MIC3
oJ4	49360800	Jack, MIC4
oJ5	49360800	Jack, MIC5
oJ6	49360800	Jack, MIC6
oJ7	49360800	Jack, MIC7
oJ8	49360800	Jack, MIC8
oJ9	49360800	Jack, MIC9
oJ10	49360800	Jack, MIC10
oJ11	49360900	Jack, MIC11
oJ12	49360900	Jack, MIC12

#### 3-3. F-6132 MIC AMP, INDICATOR & Power Supply Board

<Stock No. 01155600>

Parts No.	Stock No.	Description
•IC		
gIC702	46288800	M5220L
or	49395000	NJM2068L-D
gIC703	46288800	M5220L
or	49395000	NJM2068L-D
gIC801	46288800	M5220L
or	49395000	NJM2068L-D
gC707	48108800	47μF 50V E.B.
gC708	48108800	47μF 50V E.B.
gC807	48108800	47μF 50V E.B.
gC808	48108800	47μF 50V E.B.
•IC		
jIC701	46078900	M5218L
jIC702	46078900	M5218L
jIC703	46078900	M5218L
jIC704	46078900	M5218L
jIC705	46078900	M5218L
jIC706	46078900	M5218L
jIC707	46078900	M5218L
jIC708	46078900	M5218L

to be Continued

## &lt;F-6132&gt;

Parts No.	Stock No.	Description
jIC724	46078900	M5218L
jIC725	46078900	M5218L
jIC726	46078900	M5218L
jC701	48662600	100pF 50V C.C.
jC707	48662600	100pF 50V C.C.
jC715	48662600	100pF 50V C.C.
jC718	48662600	100pF 50V C.C.
jC721	48108800	47μF 50V E.B.
jC722	48108800	47μF 50V E.B.
•IC		
mIC1	46148600	NJM78L05A
mIC2	46544000	NJM79L05A
•Transistor		
nQ3	46367101	2SC2603
or	48058801	2SC1740S
nQ4	46367101	2SC2603
or	48058801	2SC1740S
nQ5	46367101	2SC2603
or	48058801	2SC1740S
nQ6	46367101	2SC2603
or	48058801	2SC1740S
nQ7	46367101	2SC2603
or	48058801	2SC1740S
nQ8	46367101	2SC2603
or	48058801	2SC1740S
•IC		
nIC3	46078900	M5218L
nIC4	46078900	M5218L
nIC5	46078900	M5218L
nIC6	48353100	μPD4053BC
nIC7	48353100	μPD4053BC
•Diode		
nD1	46464100	1SS133

## 3-4. F-6133 PGM OUT Terminal Board

Parts No.	Stock No.	Description
jC921~926	48662600	100pF 50V C.C. <E.G.>
oJ25	49361500	6P Pin Jack Ass'y
oJ26	49361500	6P Pin Jack Ass'y

## 3-5. F-6134 FL Display Tube Board

&lt;Stock No. 01155800&gt;

Parts No.	Stock No.	Description
aZ12	27807300	Filter C
•Transistor		
nQ1	48230000	DTA143XS
nQ2	48230200	DTC124XS
nQ9	48230000	DTA143XS
nQ10	48230200	DTC124XS
•IC		
nIC2	49373300	LC7566
nFL1	49360400	FL. Display Tube CPR1092GM

## &lt;F-6134&gt;

Parts No.	Stock No.	Description
nR7	49361900	100kΩx11 A.R.
nR8	49361900	100kΩx11 A.R.
nC7	48748400	0.1μF 50V C.C.
nC8	48748400	0.1μF 50V C.C.

## 3-6. F-6135 STEREO BALANCE &amp; STEREO BUSS Terminal Board

Parts No.	Stock No.	Description
iC907~918	48663400	470pF 50V C.C. <E.G.>
oJ29	49361400	4P Pin Jack Ass'y, STEREO BUSS
oJ30	49362000	Connector, BALANCE IN
oJ31	49362000	Connector, BALANCE IN
oJ32	49362100	Connector, BALANCE OUT
oJ33	49362100	Connector, BALANCE OUT

## 3-7. F-6136 DIRECT OUT Jack Board

Parts No.	Stock No.	Description
oJ13	49360800	Jack, CH1
oJ14	49360800	Jack, CH2
oJ15	49360800	Jack, CH3
oJ16	49360800	Jack, CH4
oJ17	49360800	Jack, CH5
oJ18	49360800	Jack, CH6
oJ19	49360800	Jack, CH7
oJ20	49360800	Jack, CH8
oJ21	49360800	Jack, CH9
oJ22	49360800	Jack, CH10
oJ23	49360800	Jack, CH11
oJ24	49360800	Jack, CH12
iC911~916	48662600	100pF 50V C.C.

## 3-8. F-6137 SEND, RETURN OF AUX1,2 &amp; MONITOR OUT Terminal Board

Parts No.	Stock No.	Description
iC919, 920	48663400	470pF 50V C.C.
iC927, 928	48662600	100pF 50V C.C.
oJ34	49360800	Jack, AUX1 SEND
oJ35	49360800	Jack, AUX1 RETURN
oJ36	49360800	Jack, AUX1 RETURN
oJ37	49360800	Jack, AUX2 SEND
oJ38	49360800	Jack, AUX2 RETURN
oJ39	49360800	Jack, AUX2 RETURN
oJ40	49360800	Jack, MONITOR OUT
oJ41	49360800	Jack, MONITOR OUT



**3-9. F-6138 Control & Power AMP Board**

&lt;Stock No. 01156200&gt;

Parts No.	Stock No.	Description
•Transistor		
jQ701	48230400	DTC143TS
•IC		
jIC710	46078900	M5218L
jIC711	46078900	M5218L
jIC712	46078900	M5218L
jIC713	48353100	μPD4053BC
jIC714	46078900	M5218L
jIC721	46673800	M5218P
jIC722	46673800	M5218P
jIC723	46673800	M5218P
jLD701	46470200	SEL2210S
jC114	48662600	100pF 50V C.C.
jC739	48662600	100pF 50V C.C.
jC740	48662600	100pF 50V C.C.
jVR1	49442200	10kΩ (A) V.R., STEREO MASTER
jVR2	49370100	10kΩ (A) V.R., AUX1 RETURN MASTER
jVR3	49370100	10kΩ (A) V.R., AUX2 RETURN MASTER
jVR4	49370100	10kΩ (A) V.R., MONITOR Level
jVR7	49370000	10kΩ (A) V.R., SOLO LEVEL
jVR107	49442200	10kΩ (A) V.R., P.G.M. LEVEL
•Transistor		
kQ1	48230000	DTA143XS
kQ2	46367001	2SA1115
	or 48058601	2SA933S
kQ3	48230400	DTC143TS
kQ4	48230400	DTC143TS
•IC		
kIC1	48577000	M5216L
	or 49385800	NJM4556L
kIC2	48577000	M5216L
	or 49385800	NJM4556L
•Diode		
kD1	46464100	1SS133
kVR1	49370100	10kΩ (A) V.R., Phones Level 1
kVR2	49370100	10kΩ (A) V.R., Phones Level 2
oS1	49367800	Push SW., METER FUNCTION
oS2	49367800	Push SW., ST BUSS
oS3	49367800	Push SW., AUX1 SEND
oS4	49367800	Push SW., AUX2 SEND
oS5	49367800	Push SW., AUX1 RETURN
oS6	49367800	Push SW., AUX2 RETURN

**3-10. F-6139 SEND Master Volume Board**

Parts No.	Stock No.	Description
•IC		
jIC715	46078900	M5218L
jVR5	49370000	10kΩ (A) V.R., AUX1 SEND Master

Parts No.	Stock No.	Description
jVR6	49370000	10kΩ (A) V.R., AUX2 SEND Master

**3-11. F-6140 Head Phone Jack Board**

Parts No.	Stock No.	Description
kC901, 902	48662600	100pF 50V C.C.
oJ42	46265700	Jack, Phone 1
oJ43	46265700	Jack, Phone 2

**3-12. F-6141 Power Supply Board**

&lt;Stock No. 01156500&gt;

Parts No.	Stock No.	Description
•Transistor		
mQ1	48508801	2SC3851
mQ2	48509101	2SA1488
mQ4	48509101	2SA1488
mQ5	46367101	2SC2603
mQ6	46367001	2SA1115
•IC		
mIC3	46148600	NJM78L05A
•Diode		
mD1	46273600	DBB10B
mD2	46273600	DBB10B
mD3	46273600	DBB10B
•Zener Diode		
mDZ1	48554600	MTZ11B
	or 48634000	RD11B2 ES
mDZ2	48554600	MTZ11B
	or 48634000	RD11B2 ES
mDZ4	48558100	MTZ30C
	or 48638400	RD30B3 ES
mDZ5	48552400	MTZ5.6B
	or 48631200	RD5.6B2 ES
mC18	49369300	220μF 50V E.C.
mC19	49369200	1000μF 63V E.C.
Δ pC1	46943200	0.01μF 400V C.C.

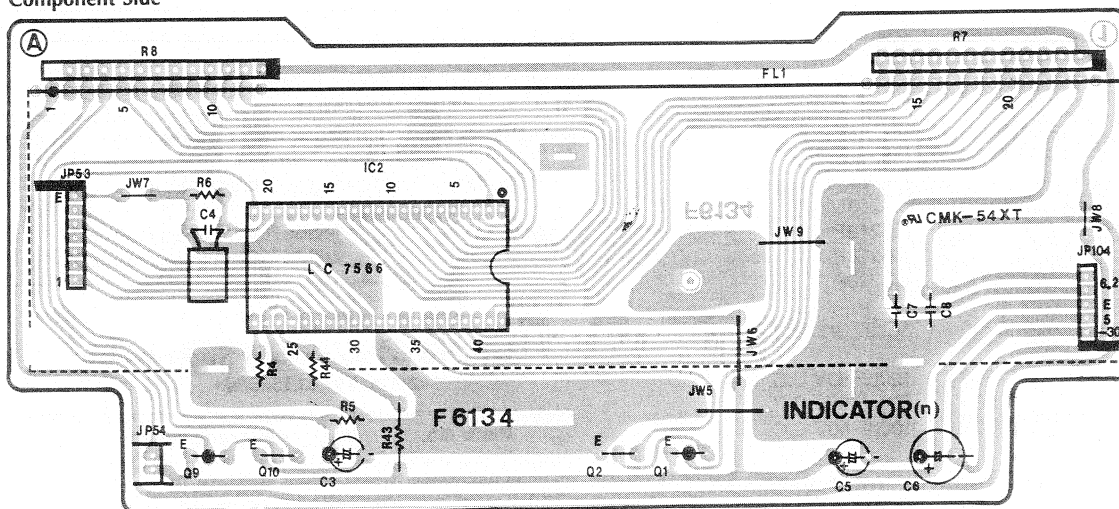
**3-13. F-6142 TAPE IN Terminal Board**

Parts No.	Stock No.	Description
jC901~906	48663400	470pF 50V C.C.
oJ27	49360700	6P Pin Jack Ass'y, TAPE IN
oJ28	49360700	6P Pin Jack Ass'y, TAPE IN

#### 4. PARTS LOCATION ON BOARD

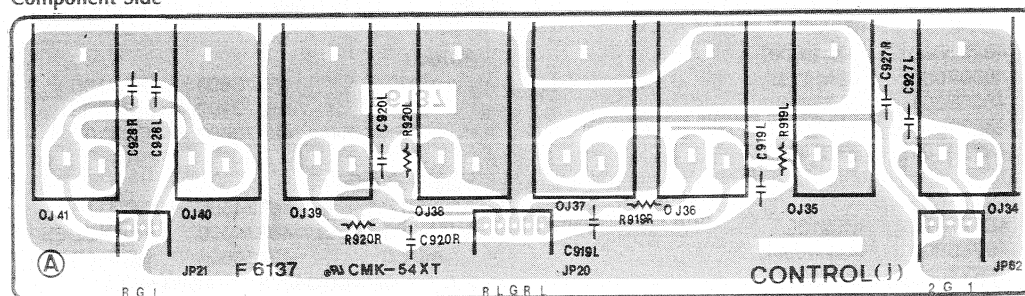
#### 4-1. F-6134 FL Display Tube Board

### Component Side



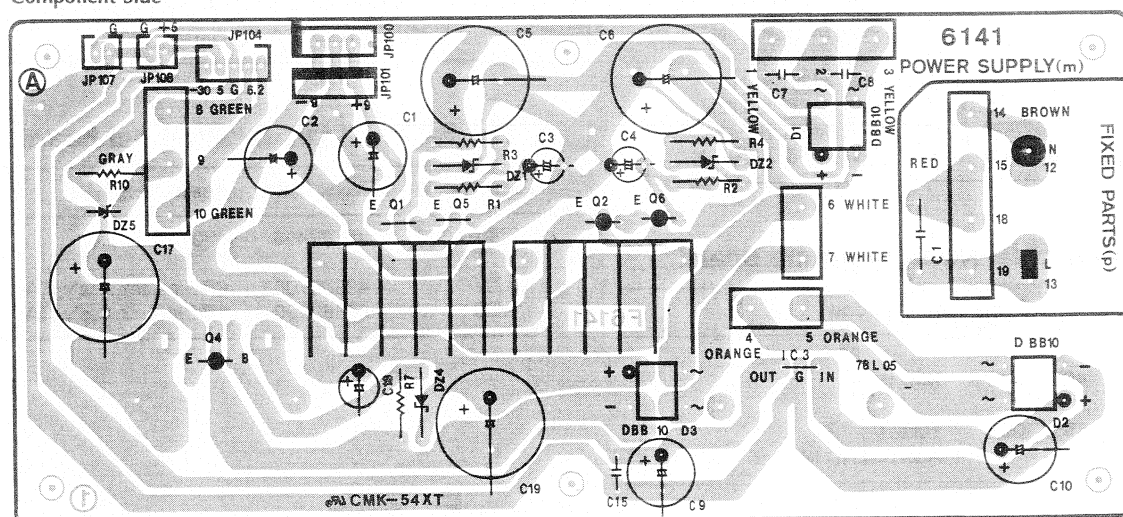
#### 4-2. F-6137 SEND, RETURN OF AUX1,2 & MONITOR OUT Terminal Board

### Component Side



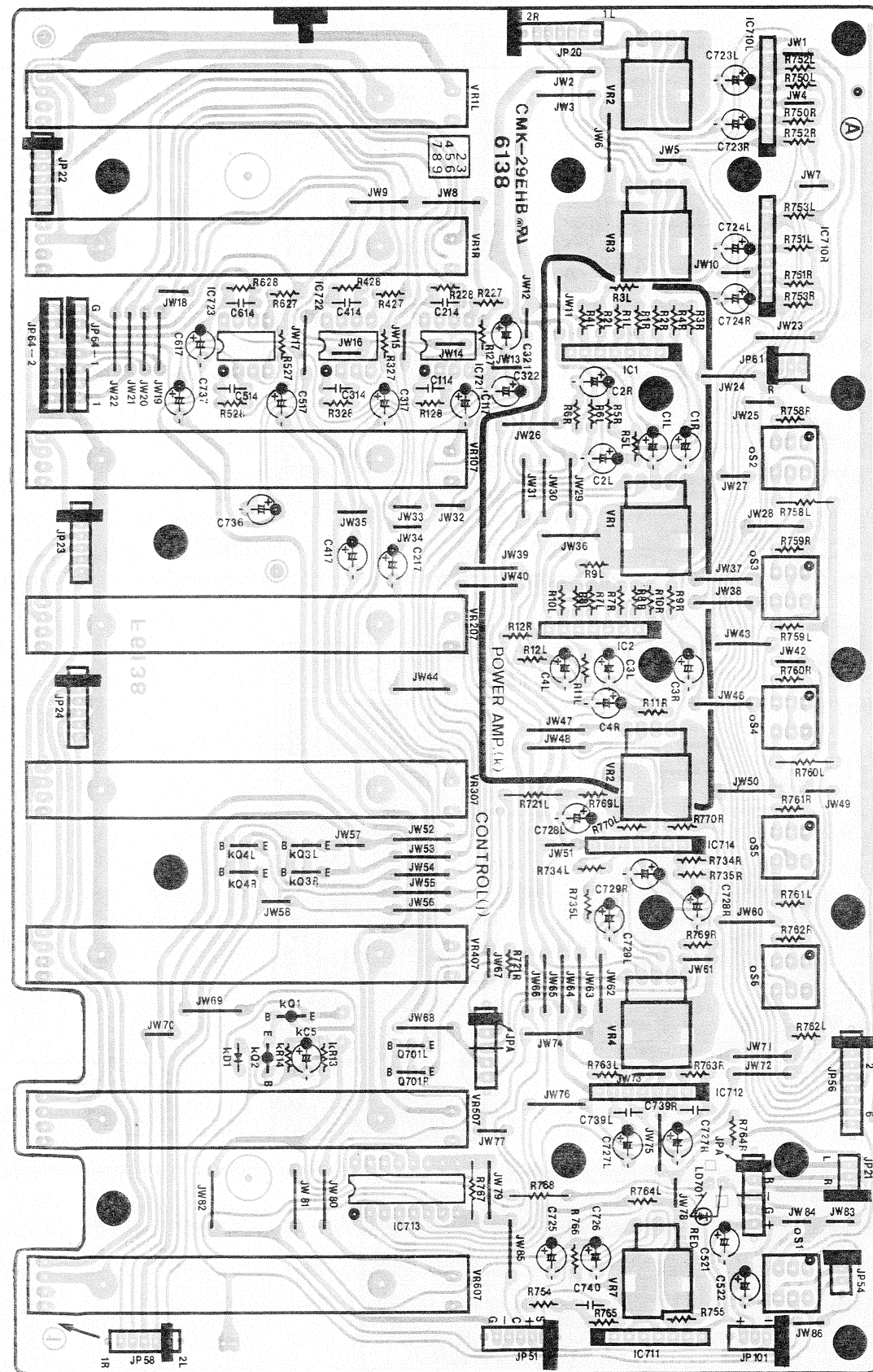
### 4-3. F-6141 Power Supply Board

### Component Side



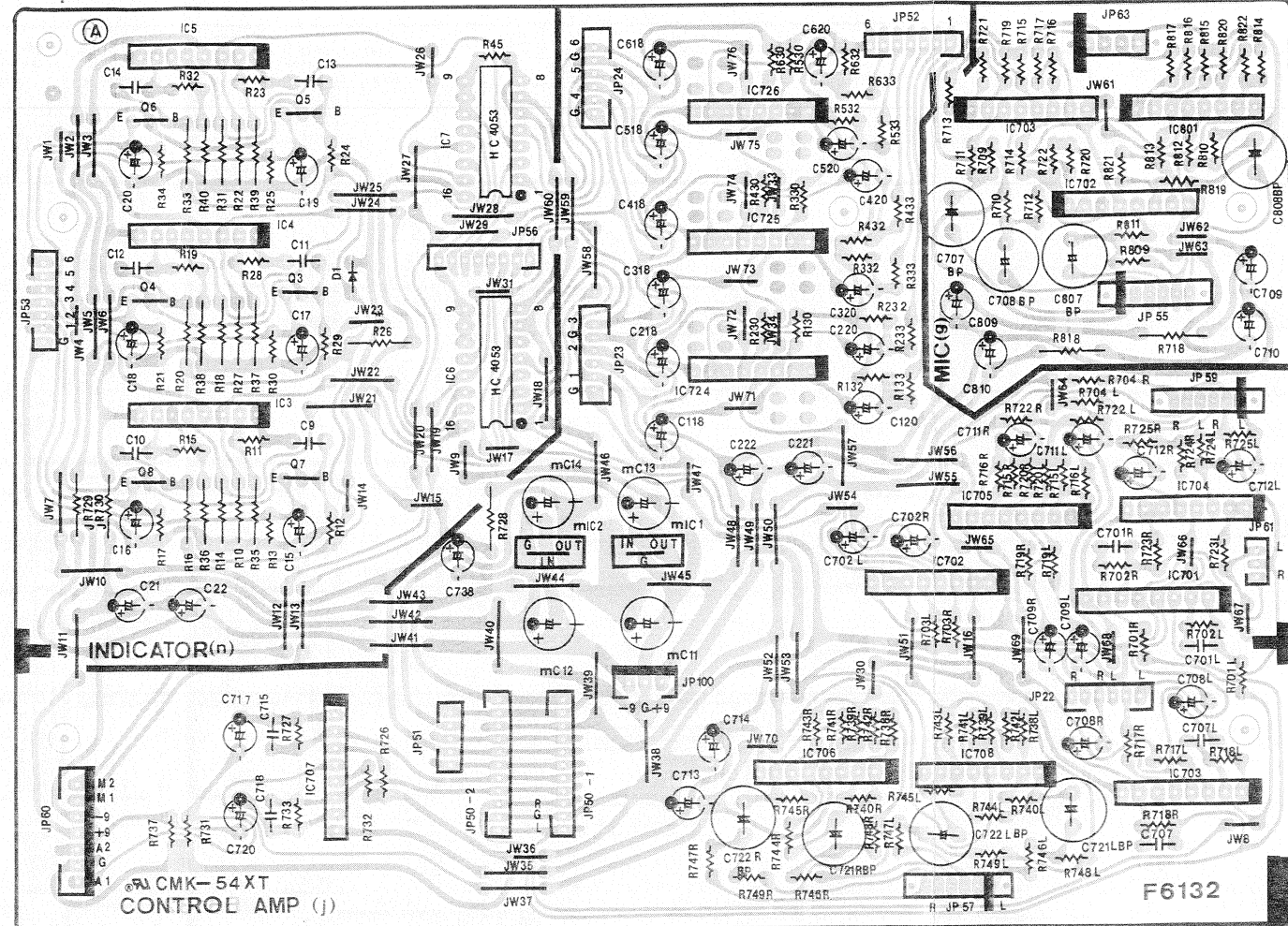
## 4-4. F-6138 Control &amp; Power AMP Board

Component Side



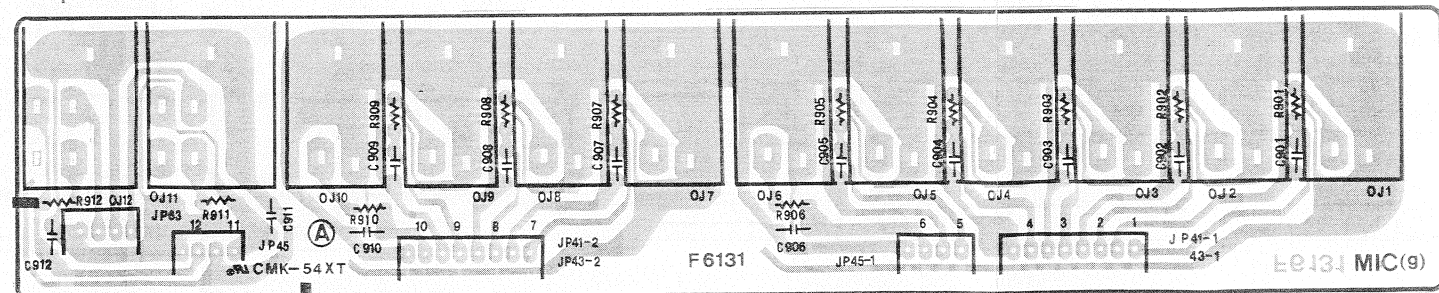
## 4-5. F-6132 MIC AMP, INDICATOR &amp; Power Supply Board

Component Side



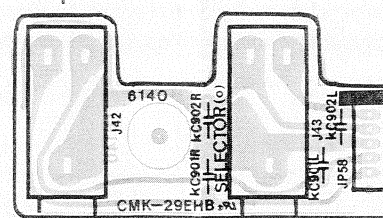
## 4-6. F-6131 MIC Jack Board

Component Side



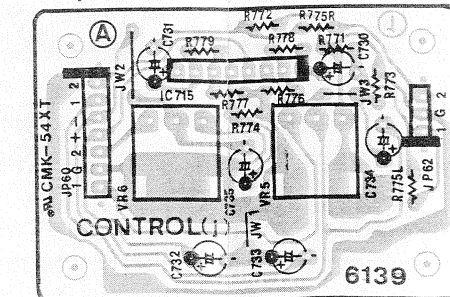
## 4-7. F-6140 Head Phone Jack Board

Component Side



## 4-8. F-6139 Send Master Volume Board

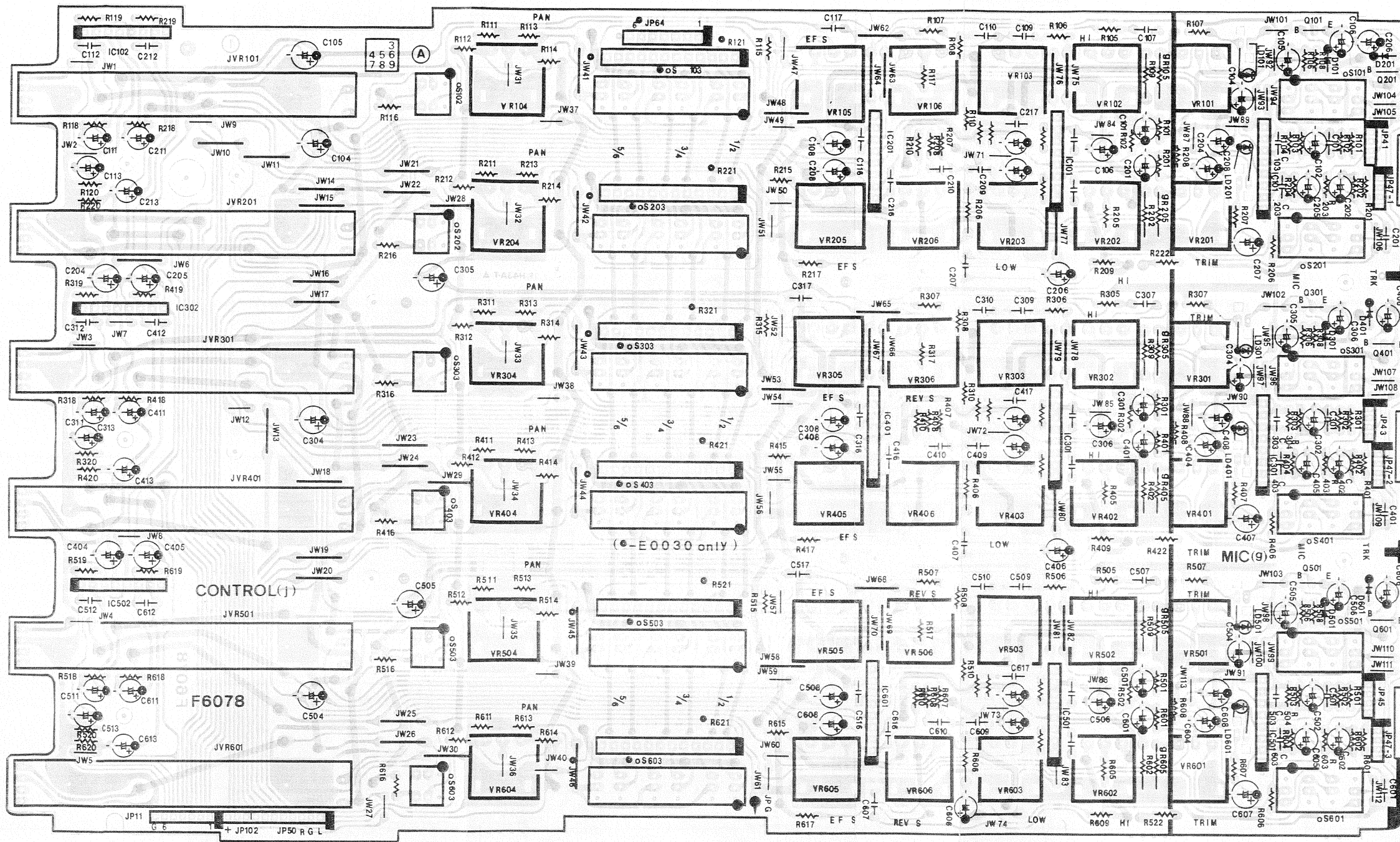
Component Side





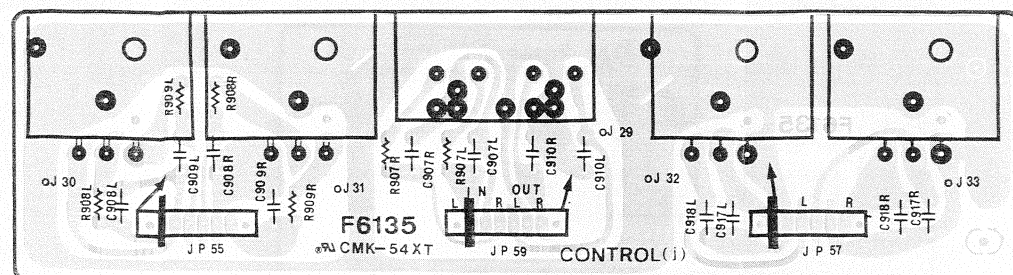
#### 4-9. F-6078 MIC & Control AMP Board

Component Side



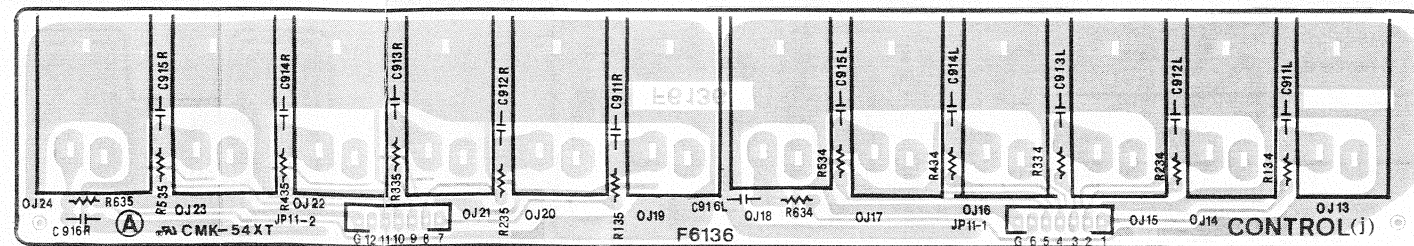
#### 4-10. F-6135 STEREO BALANCE & STEREO BUSS Terminal Board

Component Side



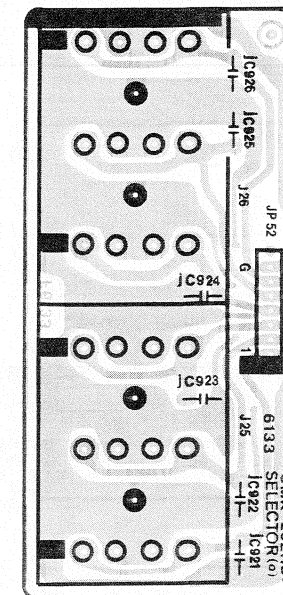
#### 4-11. F-6136 DIRECT OUT Jack Board

Component Side



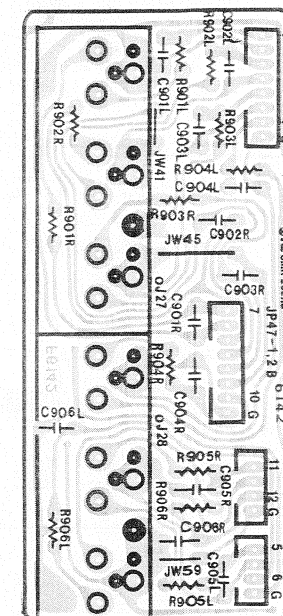
#### 4-12. F-6133 PGM OUT Terminal Board

### Component Side



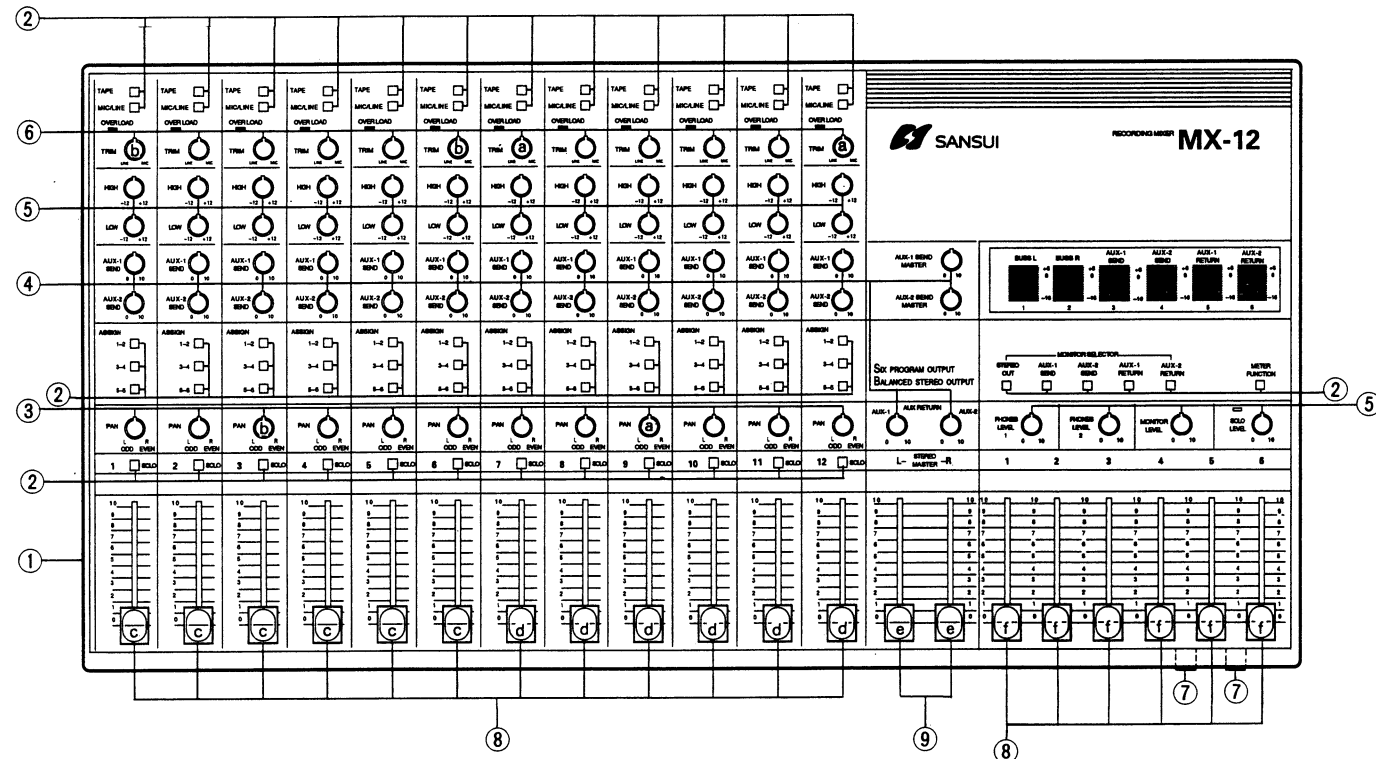
#### 4-13. F-6142 TAPE IN Terminal Board

Component Side

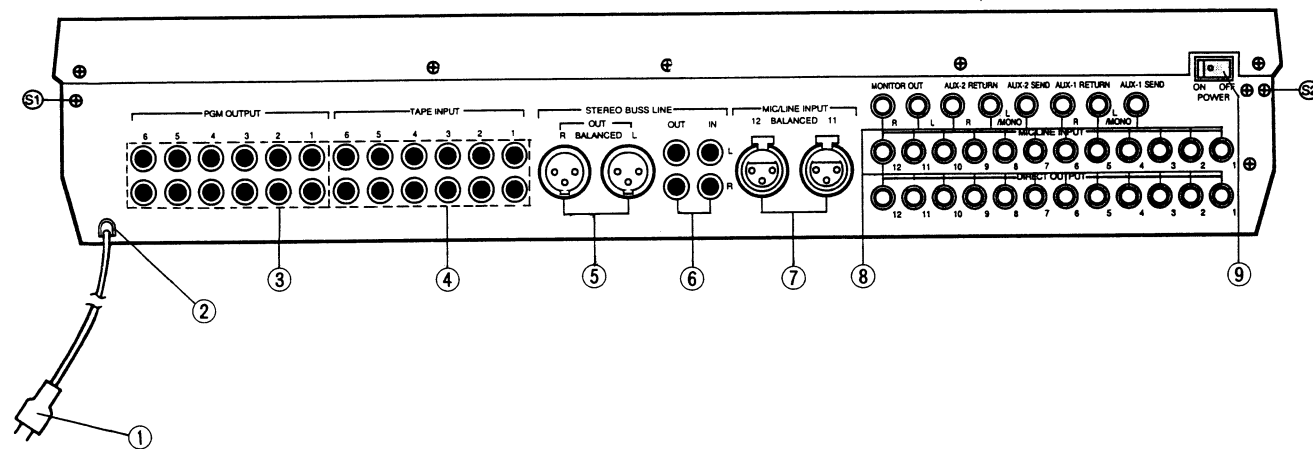


## 5. OTHER PARTS

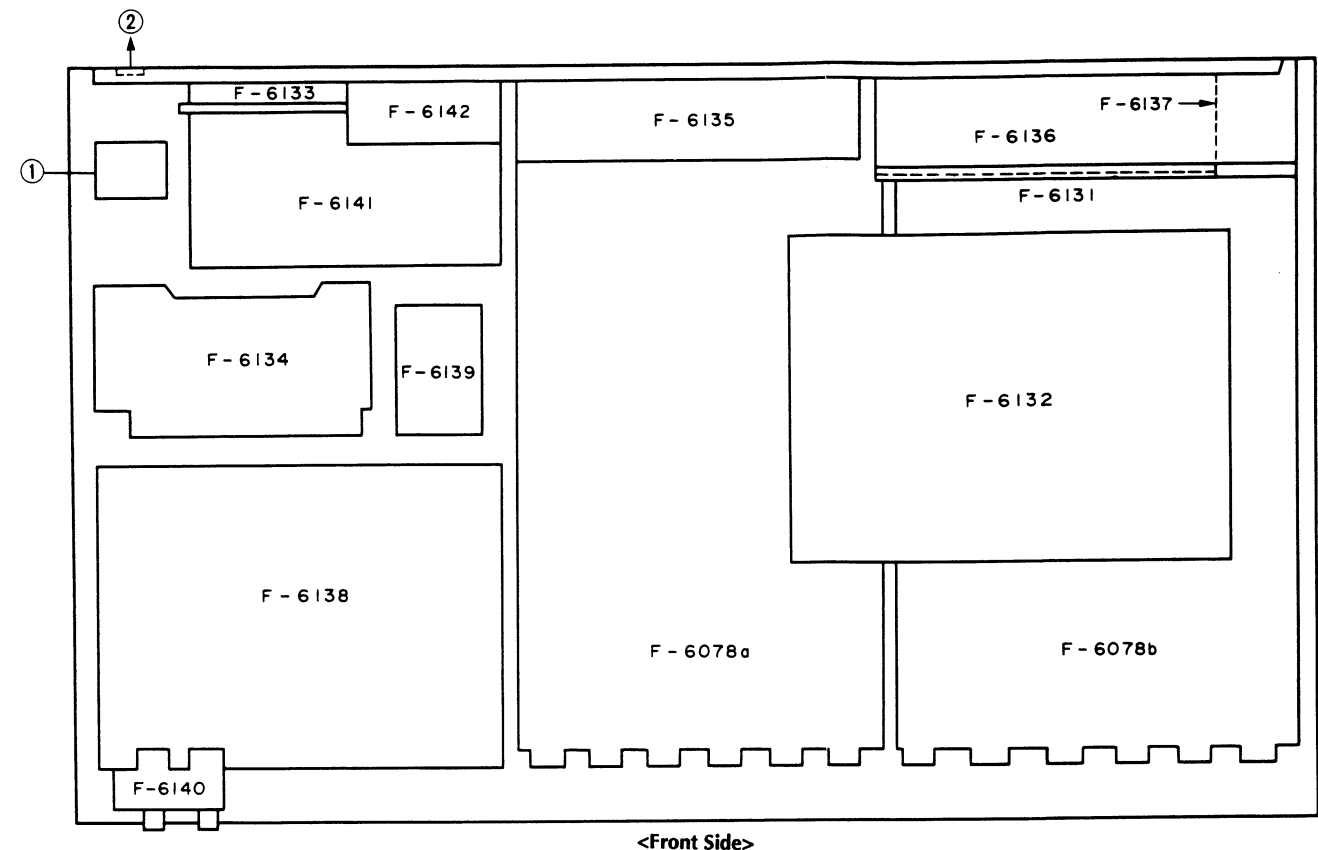
### • Top View



### • Rear View



### • Bottom View (Case Cover Ass'y)



### • Parts List <Top View>

Parts No.	Stock No.	Description
1	27783100	Case Cover Ass'y
2	27669600	Knob, 4x4 TAPE/MIC/LINE/ ASSIGN MONITOR SELECTOR/ METER FUNCTION/SOLO
3	27671100	Knob Ass'y (green), PAN
4	27770700	Knob Ass'y (blue), AUX-1, 2/ AUX1, 2 SEND MASTER/ AUX RETURN
5	27670900	Knob Ass'y (gray), HIGH/LOW/ PHONES LEVEL/MONITOR LEVEL/SOLO LEVEL
6	27671000	Knob Ass'y (red), TRIM
7	46256700	Phones Jack 1, 2
8	27672110	Slide Switch Knob (black)
9	27669710	Slide Switch Knob (gray)

### <Bottom View> (Case Cover Ass'y)

Parts No.	Stock No.	Description
Δ 1	15034400	Power Transformer <OO>
Δ	15034402	Power Transformer <XX, UL, CSA>
Δ	15034405	Power Transformer <EU, EG>
Δ 2	07204700	Voltage Selector <EU, EG>

### <Rear View>

Parts No.	Stock No.	Description
Δ 1	46541000	Power Supply Cord <OO>
Δ	46321000	Power Supply Cord <XX, UL, CSA>
Δ	38004500	Power Supply Cord <EU, EG>
2	39104900	Strain Relief <OO, XX, UL, CSA>
	39135000	Strain Relief <EU, EG>
3	49361500	6P Pin Jack Ass'y, PGM OUTPUT
4	49360700	6P Pin Jack Ass'y, TAPE INPUT
5	49362100	Canon Connector, STEREO BUSS LINE
6	49361400	4P Pin Jack Ass'y, STEREO BUSS LINE
7	49362000	Canon Connector, MIC/LINE INPUT
8	49360800	Jack, DIRECT OUTPUT/ MIC LINE OUTPUT/ MONITOR OUT/ AUX1, 2, SEND, RETURN
Δ 9	49374900	Power Switch
Δ	or 49375000	Power Switch

### <Bottom View> (see Fig. 1-1)

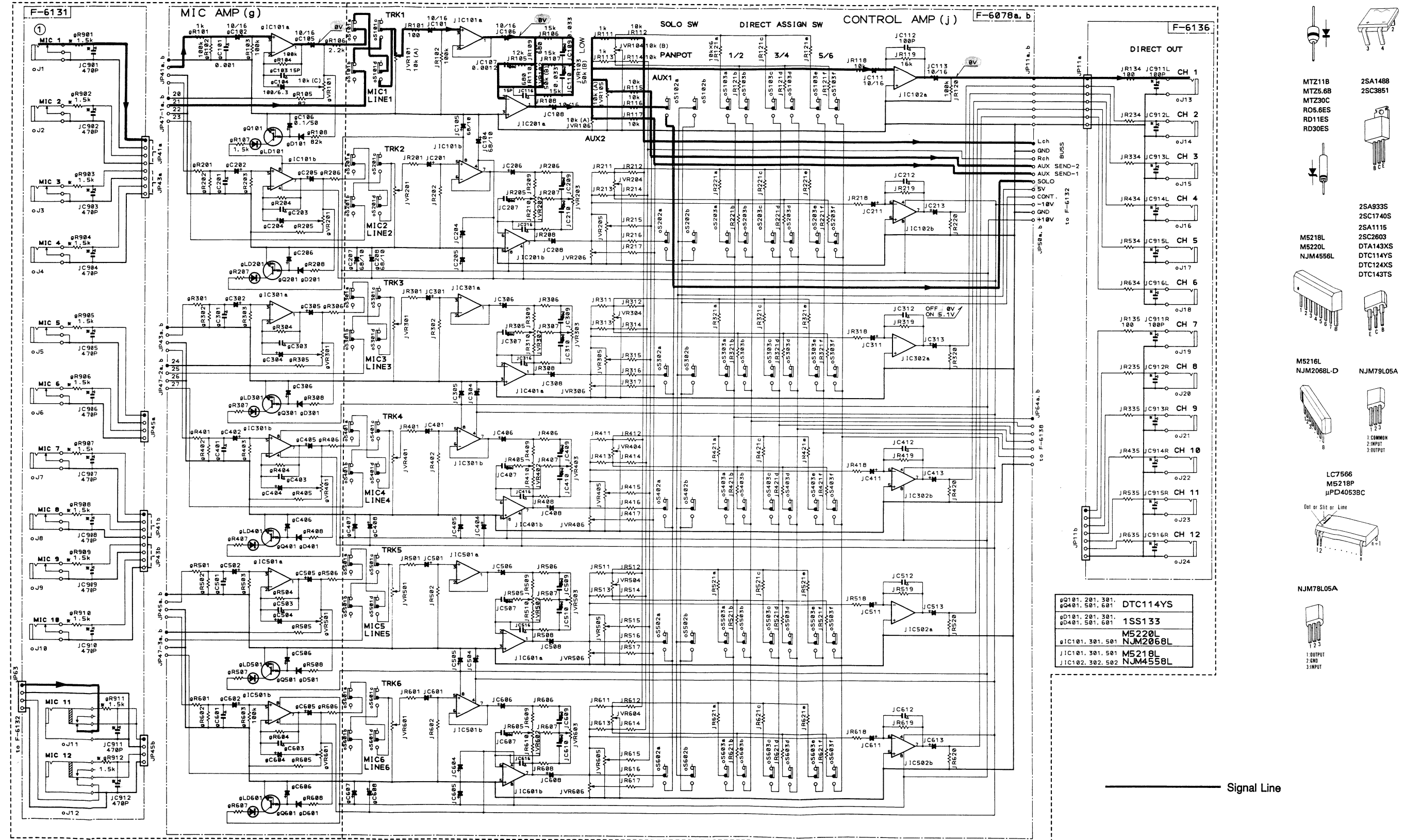
Parts No.	Stock No.	Description
1	07779800	Leg



# 6. SCHEMATIC DIAGRAM

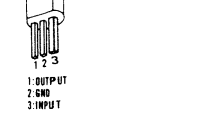
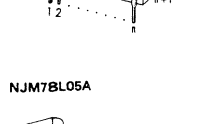
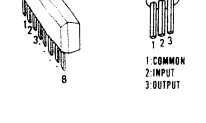
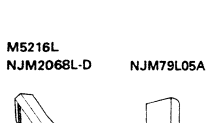
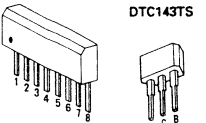
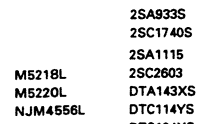
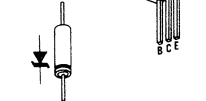
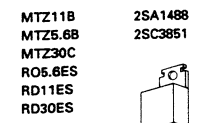
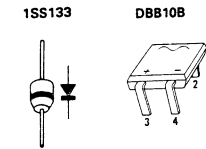
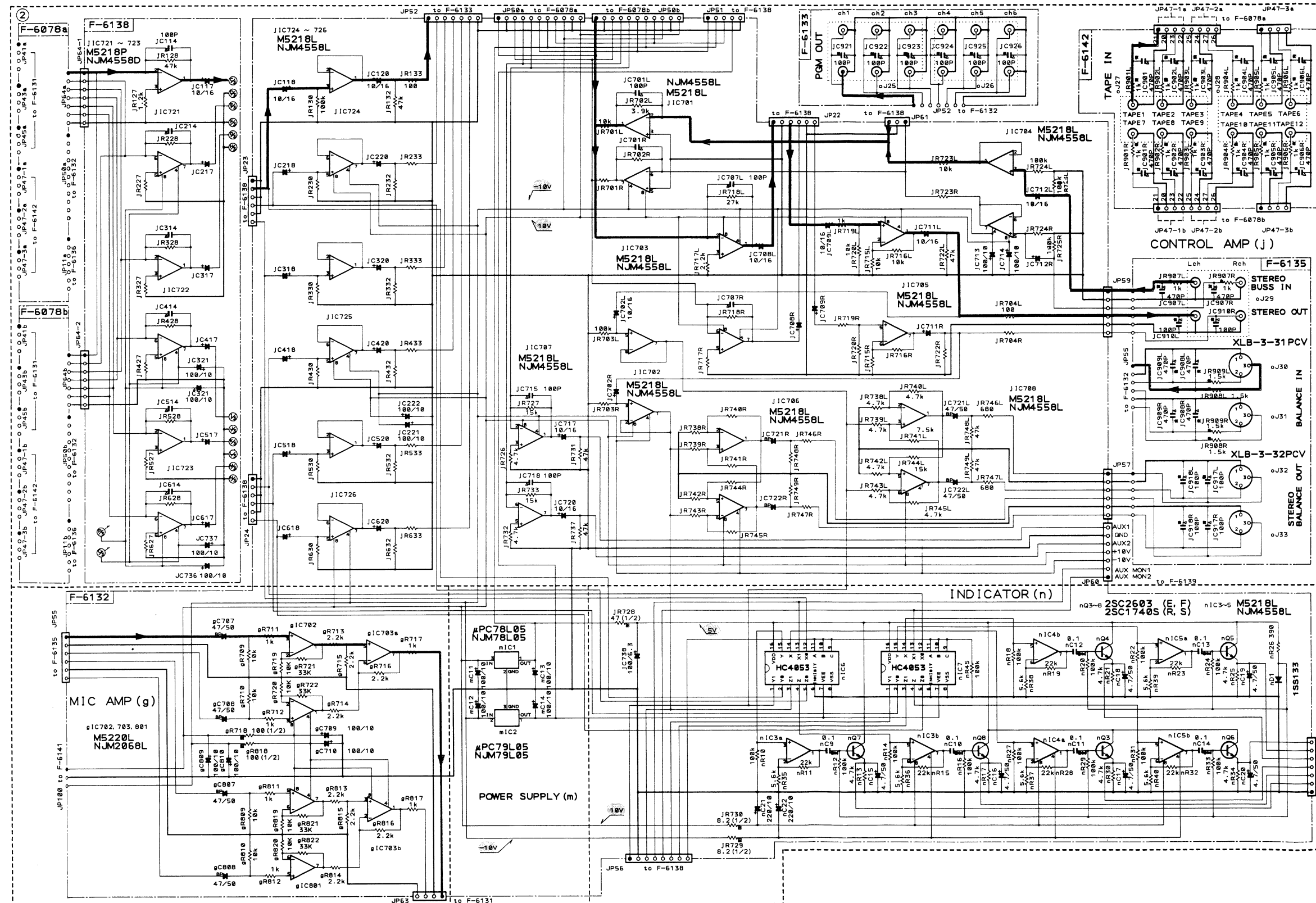
## 6-1. MIC & Control AMP Section

\* Design and specifications subject to changes without notice for improvements.



## 6-2. MIC AMP, Control AMP &amp; Indicator Drive Section

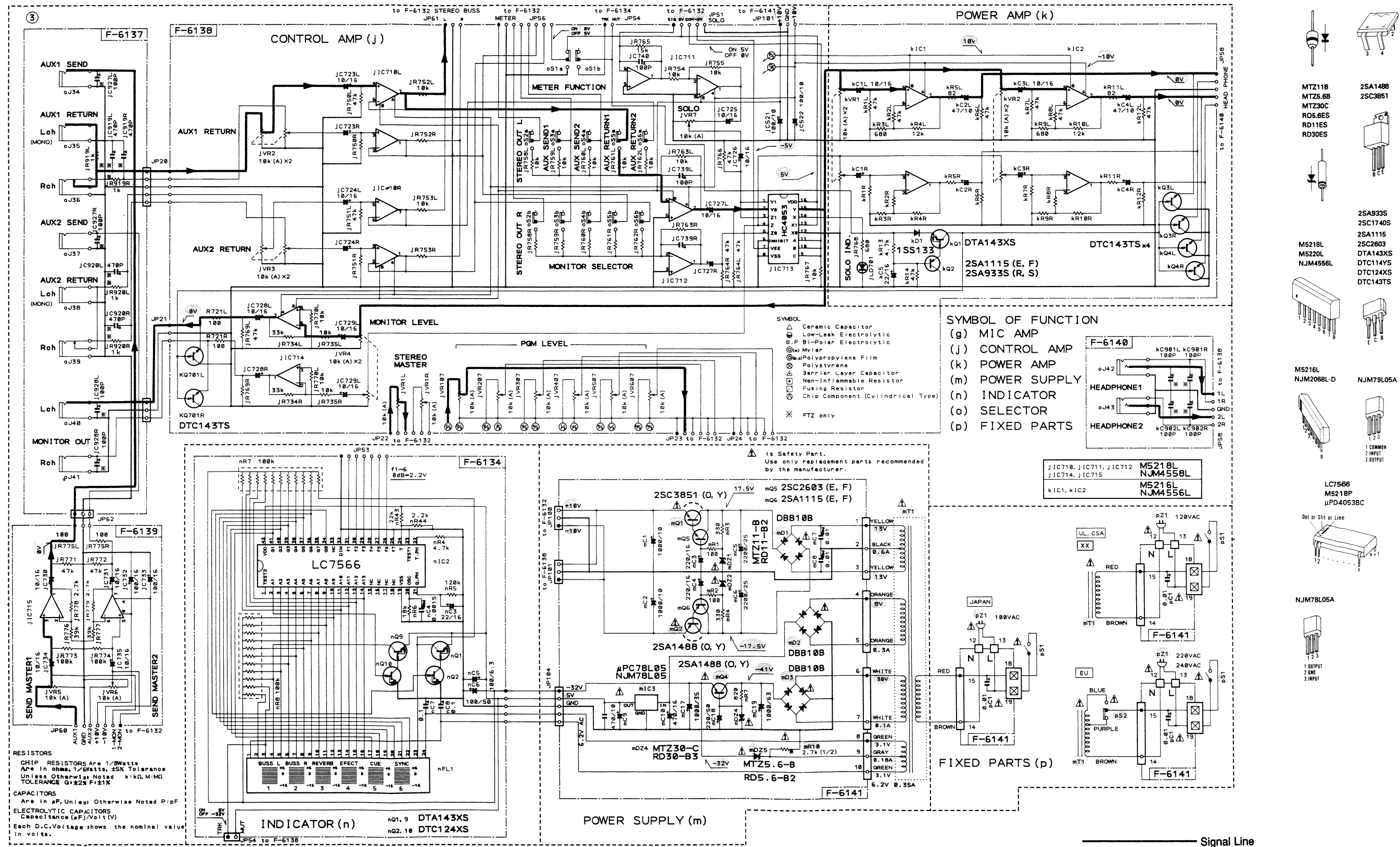
\* Design and specifications subject to changes without notice for improvements.



Signal Line

### 6-3. Power Supply & FL Display Drive Section

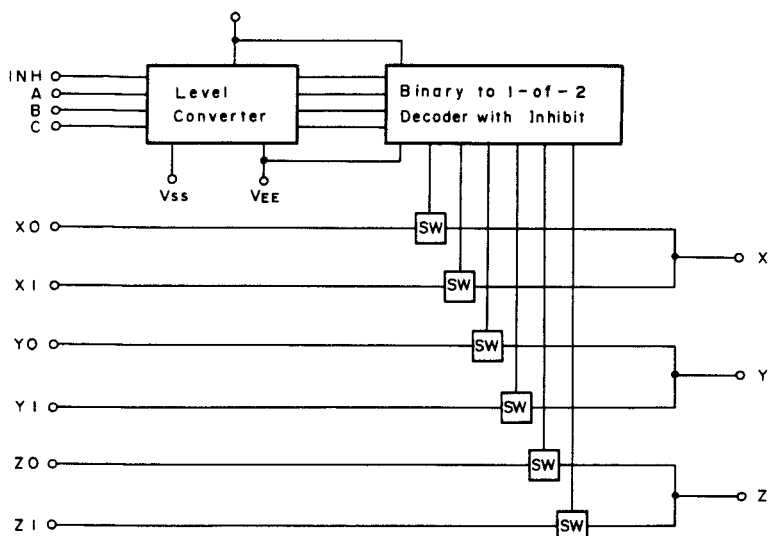
\* Design and specifications subject to changes without notice for improvements.





## 7. INTERIOR BLOCK DIAGRAM of IC & DESCRIPTION OF FL DISPLAY TUBE

### • $\mu$ PD4053BC <Multiplexer>

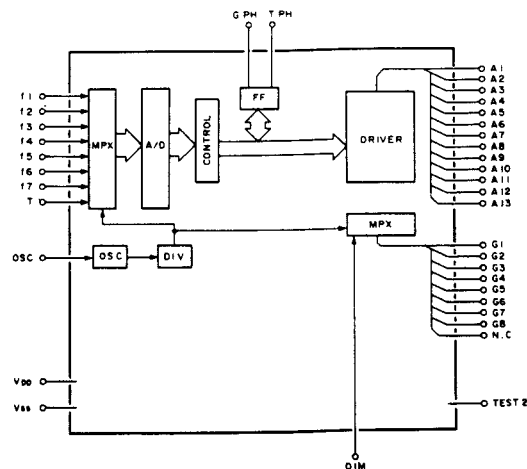


Truth Table

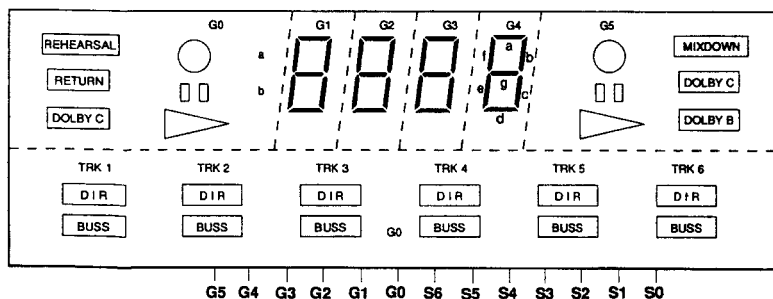
INHIBIT	Control Input			"ON" Channel
	C	B	A	
L	L	L	L	Z0, Y0, X0
L	L	L	H	Z0, Y0, X1
L	L	H	L	Z0, Y1, X0
L	L	H	H	Z0, Y1, X1
L	H	L	L	Z1, Y0, X0
L	H	L	H	Z1, Y0, X1
L	H	H	L	Z1, Y1, X0
L	H	H	H	Z1, Y1, X1
H	X	X	X	NONE

H: High level L: Low level X: H or L

### • LC7566 <FL Tube Driver>



### • CPR1092GM <FL Display Tube>

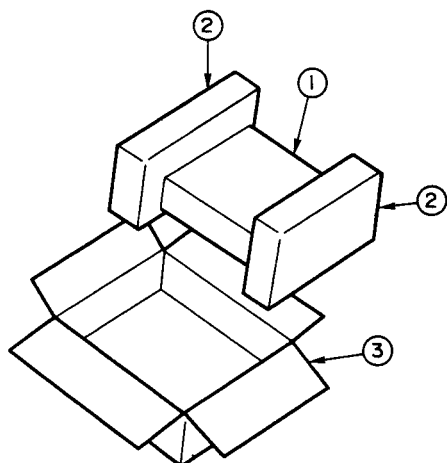


	G0	G1	G2	G3	G4	G5	G0	
S0	REHEARSAL	a	a	a	a		DIR	BUSS R
S1	RETURN	b	b	b	b		BUSS L	DIR
S2	a	f	f	f	f		DIR	BUSS L
S3	○	g	g	g	g	○	BUSS R	DIR
S4	□	c	c	c	c	□	DIR	BUSS R
S5	b	e	e	e	e	MIXDOWN	BUSS L	—
S6	▷	d	d	d	d	▷	DIR	—
—	DOLBY C	—	—	—	—	DOLBY C	DOLBY B	

Pin No.: 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16  
Assignment: F G6 G5 G4 G3 G2 G1 G0 PA PB PC PD PE PF PG PH

Pin No.: 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31 32  
Assignment: PI PJ PK PL PM PN PO PP S6 S5 S4 S3 S2 S1 S0 F

## 8. PACKING & ACCESSORY LIST



### Parts List <PACKING LIST>

Parts No.	Stock No.	Description
1	27690500	Vinyl Bag
2	27767200	Styrofoam Packing
3	27716000	Carton Case
		<XX, UL, CSA, EU, EG>
	27715900	Carton Case <OO>

### Parts List <ACCESSORY LIST>

Parts No.	Stock No.	Description
	19050800	Operating Instruction <OO>
	19050900	Operating Instruction
		<XX, UL, CSA, EU, EG>



SANSUI ELECTRIC CO. LTD.:

SANSUI ELECTRONICS CORPORATION:

SANSUI ELECTRONICS G.M.B.H.:

山水電気株式会社

本社

東京都杉並区和泉2-14-1 (〒168)

14-1, Izumi 2-chome, Suginami-ku, Tokyo 168 Japan  
 PHONE: (03) 324-8891 / TELEX: 232-2076 (International Division)  
 1250 Valley Brook Ave. Lyndhurst, N.J. 07071 U.S.A.  
 17150 South Margay Ave. Carson, California 90746 U.S.A.  
 3036 Koapaka Street, Honolulu, Hawaii 96819 U.S.A.  
 Paul Ehrlich Strasse 8, 6074 Rödermark 2, West Germany

(SM2-123)

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